

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, September 1937, at selected stations

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	29.82	-0.03	30.38	29	29.20	16
Dutch Harbor	29.73	-.03	30.44	26	28.72	15
St. Paul	29.78	+.07	30.48	26, 28	28.82	15
Kodiak	29.81	+.10	30.44	27	28.96	10
Juneau	30.03	+.11	30.33	27	29.64	29
Tatoosh Island	30.06	+.06	30.51	24	29.48	30
San Francisco	29.94	+.00	30.12	24	29.80	20
Mazatlan	29.85	+.03	29.92	23	29.74	17
Honolulu	30.02	+.02	30.11	1	29.91	26
Midway Island	30.02	+.01	30.18	7	29.84	26
Guam	29.86	+.03	29.92	8, 10	29.82	6
Manila	29.80	+.03	29.88	12, 13, 18, 19	29.62	10
Hong Kong	29.83	+.06	29.96	29	28.30	2
Naha	29.86	+.10	30.00	19, 20, 28, 29	29.32	9
Chichishima	29.96	+.10	30.18	3, 15	29.71	24

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

*Extratropical cyclones and gales.*—Several cyclonic disturbances occurred in high latitudes of the north Pacific during September. Barometer readings below 29 inches were recorded at Kodiak on the 10th; on board the Japanese motorship *Hikawa Maru*, near latitude 50° N., longitude 173½° W., on the 14th; and at Dutch Harbor and other nearby points on the 15th. The highest local winds reported in the vicinity of the storm areas on these dates, however, did not exceed force 8. The strongest winds experienced by reporting ships in northern waters were of force 10. One was reported by the American steamer *President Jackson*, on the 2d, a short distance south of the central Aleutians; the other, by the British steamer *Talithybius* on the 12th, near 52° N., 144° W.; both were accompanied by barometric minima of about 29.50 inches.

Gales of forces 8 to 10 were local in connection with all high latitude disturbances, and, so far as indicated by ships' mail and radio observations, occurred in scattered localities on only 10 or 12 days.

Most of the cyclones were irregular in movement. One, however, can be traced from a position east of northern Japan on the 17th, until it entered Alaska on the 24th. It appeared to have little intensity; the only gales worthy of mention within its field occurred on the 19th, of force 9, to the southwestward of the western Aleutians.

The only gale reported in coastal waters of the United States was of force 8, from north-northeast, experienced by the American steamer *Texas*, near Point Arena, Calif., on the 20th.

On the 29th and 30th a storm area of moderate intensity lay off the coasts of Washington and British Columbia. In connection with it, a gale of force 8 was reported by radio north of Queen Charlotte Island on the 29th. Similar reports on the 30th showed that winds of like force were blowing at a considerable distance to the southward, one being as far south as 45½° N., 132° W.

*Tropical cyclones—Typhoons.*—A very mild disturbance west of Mexico appeared near 15° N., 102° W. on September 1 and, moving northwest, disappeared on the 3d near the Revillagigedo Islands. No high winds were reported in connection with this disturbance.

During the 9th to 11th a cyclone of considerable intensity moved from a location about west of Acapulco northwestward past the mouth of the Gulf of California, and disinte-

grated at some distance west of southern Lower California. The earliest gale in connection with the disturbance was from the east, force 8, barometer 29.76, met by the American steamer *Kekoskee*, near 18° N., 104° W., on the 9th. At 4 a. m. of the 10th, in 19°48' N., 106° W., the American steamer *Steel Engineer* had a southeast gale of force 9, barometer 29.76. Later in the day, a short distance south of Cape San Lucas, the American steamer *San Lucas* encountered the strongest wind, from the east of force 10, and the lowest barometer, 29.52, observed in connection with the storm. The highest wind reported on the 11th was of force 8, from the east-southeast, experienced at 2 p. m. on the Japanese steamer *Bengal Maru*, in 24°12' N., 112°13' W.

Disturbed conditions lay over and in the vicinity of the Gulf of California on the 16th to 20th, but cyclonic development was immature. The highest wind reported during the period was of force 7, from south-southeast, near 20° N., 107° W., met by the Dutch steamer *Delftdyk* barometer 29.64.

In the Far East much more serious cyclonic storms occurred, in particular the intense typhoons that ravaged Hong Kong on September 2 and southern Japan on September 11. These and other tropical cyclones of the month are described elsewhere in this issue of the REVIEW by the Rev. Bernard F. Doucette, S. J., of the Manila Observatory, Philippine Weather Bureau. The only note that may be added in connection with the Japanese typhoon is that one of our observing vessels, the Japanese motorship *San Pedro Maru*, while near 38° N., 144° E., on the 12th, experienced a south gale of force 9, barometer 29.49, as the storm entered the open Pacific from northern Honshu.

*Fog.*—There was a considerable decrease in the September occurrence of fog over that of the preceding month along the northern steamer routes. Between the Aleutian Islands and Japan practically all the fog reported was observed, rather scattered, on the 5th to 9th. From northern midocean eastward to longitude 130° W., there were 12 days reported with fog, scattered along the route, and occurring on not more than 5 days in any one 5-degree square. No fog was reported by ships along the Washington and Oregon coasts, but along the California coast it occurred on at least 12 days, and off Lower California on 2 days. Fog was observed on the 2d southwest of the Revillagigedo Islands.

#### TYPHOONS AND DEPRESSIONS OVER THE FAR EAST, SEPTEMBER 1937

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*Typhoon August 24–September 3, 1937.*—From August 24 to 30, as this storm moved west-northwest across the Pacific from a position about 200 miles south of Guam, there was little evidence of its potentialities. During the afternoon of August 28, the U. S. S. *Ramapo* experienced a shifting of winds that indicated the passage of the center a short distance south of the ship's position. It is possible that for some hours the center did shift its course in that way, but the next day found it moving along a west-northwest course. The lowest barometer reading on board the U. S. S. *Ramapo* was 29.61 inches at 4 p. m. August 28 (Manila time). The wind was coming from the north-northwest, velocity 33 knots, the ship being near latitude 13°4' N., longitude 131°7' E. (the position

of the ship at 4:45 p. m. when the shift of the wind to the east occurred). If the depression had already developed into a typhoon at this stage, it was a very small center and the hurricane winds did not extend far away from the calm area. In the early hours of August 30, however, it began to intensify in earnest (about 400 miles east of Luzon), as it moved west-northwest toward the Balintang Channel. Passing about 30 miles south of Basco, August 31, it then inclined somewhat to the west, and shortly after took a west-by-north course, which brought the typhoon center close to and north of Pratas, and later, close to and south of Hong Kong. It disappeared into the Continent September 3.

From August 31 to September 2, this typhoon was very violent and inflicted very much damage in Hong Kong as it passed that locality. Basco, Batan Province, on August 31, 1 p. m. had its barometric minimum, 739.43 mm (29.102 inches, gravity correction applied). The wind was east-northeast, force 9 at the time. One hour before, the wind was from the same direction but with a force of 11, the most violent winds experienced at the station during the passage of the typhoon. From Pratas, September 1, 2 p. m., the observation received was, barometer 744.9 mm (29.327 inches) with northwest winds, force 8. Thus far the typhoon was intensifying quite rapidly, but its real strength was not manifested until it reached the locality of Hong Kong, during the early morning hours of September 2.

The official statement of Mr. C. W. Jeffries<sup>1</sup> submitted to the press after the typhoon had passed is given below.

The typhoon formed to the east of Luzon during August 28 to 30. Its position was indefinite until the afternoon of the latter date when it was situated about 300 miles northeast of Manila moving northwest-by-west. By the morning of August 31 it had reached the eastern extremity of Balintang Channel, from thence on moving in a westerly direction until 6 a. m. Wednesday (Sept. 1) when it was situated about 100 miles east-by-south of Pratas Shoal. From this period it moved west-northwest, passing to the north of Waglin and the south of the Royal Observatory between 3 and 4 a. m. yesterday (Sept. 2). The stand-by signal No. 1 was hoisted at 12:35 a. m. Wednesday and signal No. 5 denoting gale from the northwest at 3:20 p. m. The No. 10 signal denoting a wind of typhoon force was expected was hoisted at 1:58 a. m. and bombs fired at 2:10 a. m. yesterday.

The wind increased rapidly in force until 2 a. m. blowing from the north and veering toward east after 3:30 a. m. By this time the squalls were of a phenomenal intensity, many occurring which were beyond the capacity of the anemograph, that is, greater than 125 m. p. h. The lowest reading of the barometer was 28.30 inches between 3:45 and 3:50 a. m. The rainfall amounted to 5.055 inches between 10:30 a. m. on Wednesday and 7:30 a. m. yesterday (September 2). The typhoon afterward entered the coast and filled up to the northwest of Macao.

After passing Pratas on Wednesday, the storm gave no indication of the intensity which characterized its passage across the Colony. It is doubtful if a storm of greater severity and destructive power has ever visited the Colony. The barometric minimum of 28.298 inches compared with the previous record of 28.590 inches on August 18, 1923.

Shortly after dawn there were signs that the gale was decreasing in force, although a fierce wind continued to sweep the Colony, leaving destruction in its wake. At 7:20 a. m., the No. 8 signal (gale expected from southeast) was hoisted.

A complete account of the destruction wrought by this typhoon cannot be given here. A few details from Manila newspapers will be given to indicate the extent of the catastrophe. The loss of life was estimated to be at least 500. The property loss due to the rains and the tidal waves could not be estimated. Many ships were cast

upon the shore, some seriously damaged. Of these ships, the Manila papers made prominent mention of the S. S. *Asama Maru*, the S. S. *Conte Verde*, and the S. S. *Van Heutz*. Later on, news that the *Conte Verde* had been refloated was received. Concerning the other ships, no special news has been given to the public.

*Typhoon, August 31–September 13, 1937—Secondary depression, September 7–9, 1937.*—As a depression during the first part of its course, this storm moved northwest and west-northwest from its region of formation about 150 miles south of Yap. When it reached the locality of latitude 17° N., longitude, 126° E., it recurved to the northeast, moving slowly along this course and gradually intensifying, so much so that a secondary depression formed, probably on September 7. On September 8, however, the primary disturbance really manifested the strength of a well-developed typhoon which then traveled rapidly toward the west, changing to this course during the forenoon of September 8. It again recurved to the northeast when about 60 miles south-southeast of Naha. Along this northeasterly course, it moved toward Japan, crossing the southern part of that country and entering the Sea of Japan. There it gradually inclined to the east-northeast, traversed northern Japan, and continued on toward the Aleutian Islands.

It might be of interest to place on record some of the observations received for the weather map which indicate the intensity of the storm. All of these observations were made on September 10, when the typhoon was located over the Nansei (Loochoo) Islands. At 6 a. m. Oshima had southeast wind, force 5 with pressure 745.0 millimeters (29.331 inches); Naha had northwest winds force 7 with pressure 744.6 millimeters (29.315 inches); and Borodino had south wind force 8 with pressure 745.0 millimeters (29.331 inches). The afternoon observations (2 p. m. Manila time) were as follows. Oshima reported northeast wind force 7 and pressure 735.1 millimeters (28.941 inches); Naha reported west-northwest wind, force 6, and pressure 747.1 millimeters (29.413 inches); and Borodino reported southeast wind force 7 and pressure 747.8 millimeters (29.441 inches).

As this typhoon crossed southern Japan, September 11, serious damage to property occurred, but the news dispatches did not give details except to state that most of the damage was along the coast and was inflicted upon small vessels.

From September 7 to 9, a secondary depression appeared about 300 miles east-northeast of Manila. It moved northward and on September 10 was absorbed into the more active disturbance over the Nansei (Loochoo) Islands.

*Typhoon, September 14–22, 1937.*—A depression originated about 120 miles southwest of Yap and moved along a west-northwest course to the northern part of central Luzon, which it crossed during the night of September 17. In the China Sea it inclined somewhat to the northwest for 1 day, and then took a westerly course, crossing Hainan Island. Here it intensified and entered Indo-China as a typhoon, but quickly diminished in intensity as it moved inland. No trace of it could be found on the weather maps of September 22. With the morning reports of September 21, Phulien included the statement that winds of force 11 were experienced at that station at 2 a. m. that morning. The direction was not stated, but was, most likely, from the northeast quadrant.

<sup>1</sup> The South China Morning Post, September 3, 1937, published in Hong Kong.